year he also took the B.Sc. degree in the University of London. In 1883 he duly gained a first-class in the Natural Sciences Tripos, part i., a success which was followed in 1884 by a first class in part ii., his subjects being botany and animal physiology. After taking his B.A. degree, there was some uncertainty as to which science he would pursue, but his inclination was to botany, his first scientific contribution being a paper on the glands of the Hypericaceæ, which appeared in the Journal of the Linnean Society, 1884. Circumstances, however, led him to devote himself for a time to animal physiology; in 1885 he was appointed senior demonstrator in that subject by the late Sir Michael Foster, a position which he held for two years. Nevertheless, he was engaged, during that time, in botanical research, the results of which were published in two papers read before the Royal Society: the one on the proteid substances in latex (Proc. Roy. Soc., 1886); the other, larger and more important, on the changes in the proteids in the seed which accompany germination (Phil. Trans., 1887), in which he confirmed for the Lupin the discovery by von Gorup-Besanez (1874) of a proteolytic enzyme in the seeds of the Vetch. These papers indicated the direction in which his future work was to lie.

His appointment, in 1887, as professor of botany to the Pharmaceutical Society of Great Britain enabled Green to devote himself entirely to botany, and this he did whole-heartedly. During the twenty years that he held this office, his literary output was voluminous. The first twelve volumes of the *Annals of Botany* (1888–98) contain a number of papers by him on various points in the biochemistry of plants; and he contributed several articles to the first series (1894–8) of *Science Progress*. Perhaps the most important of his investigations during this period were, that on the germination of the seed of the castor-oil plant (Proc. Roy. Soc., 1890), in which he detected the fat-splitting enzyme (lipase), a subject to which he returned years afterwards (Proc. Roy. Soc., 1905); that on the germination of the pollen-grain (Phil. Trans., 1894), proving the presence and activity of amyloclastic enzymes both in the grains and in the tissue of the style; and that on the action of light on diastase (Phil. Trans., 1897), where the effect of light on diastase is investigated and it is shown that whereas the red and the blue rays favour the formation of the enzyme, the green, the indigo, the violet, and especially the ultra-violet rays destroy it; and the striking suggestion is made that "vegetable structures have a power of absorbing radiant energy, which is not connected with the presence and activity of chlorophyll."

In addition to these papers and articles, Green found time to write three considerable books: "A Manual of Botany based upon that of the late R. Bentley, 1895–6; "An Introduction to Vegetable Physiology," 1900; and "The Soluble Ferments and Fermentation," 1899. All three went on to a second edition, but the last was the most successful and important of them; a German translation of it, by Windisch, was published. They are characterised by the lucidity of exposition that he possessed in a high degree.

Owing to failing health, Green resigned his professorship in 1907, and undertook the less onerous duties of the Hartley lectureship on vegetable physiology in the University of Liverpool, still, however, residing at Cambridge. He was commissioned by the delegates of the Clarendon Press, Oxford, to write a continuation, published in 1909, of Sachs's "History of Botany" (1530–1860), to bring the record up to the end of the nineteenth century; a difficult task which he performed with as much success as the circumstances permitted. He became so interested in work of this kind that he planned, and I believe completed, a history of botany in England, which, unfortunately, has not yet been published.

A few personal details in conclusion. Green proceeded M.A. at Cambridge in 1888, D.Sc. in 1894; he became a Fellow of the Linnean Society in 1889, and was elected to the Royal Society in 1895. He was president of Section K (botany) at the Belfast meeting of the British Association in 1902; and in the same year he was elected Fellow of Downing College, Cambridge.

S. H. VINES.

NOTES.

THE June conversazione of the Royal Society will be held on Tuesday next, June 16.

SIR WILLIAM OSLER, F.R.S., Regius Professor of Medicine in the University of Oxford, has been elected a foreign Associate of the French Academy of Medicine.

PROF. A. LACROIX, professor of mineralogy at the Paris Natural History Museum, has been elected permanent secretary of the Paris Academy of Sciences in succession to Prof. Van Tieghem.

DR. R. S. LULL, professor of vertebrate palæontology at Yale, will this summer conduct another western expedition from the Peabody Museum for the purpose of securing skeletons of prehistoric horses.

THE council of the Royal Society of Arts, with the approval of the president, H.R.H. the Duke of Connaught, has awarded the Albert medal for the current year to Chevalier Guglielmo Marconi, "for his services in the development and practical application of wireless telegraphy."

THE Khedive has conferred the third class of the Order of the Medjidieh upon Mr. W. Lawrence Balls on the occasion of his retirement from the service of the Egyptian Government. This is, we believe, the first decoration given for agricultural work since the foundation of the Department of Agriculture in 1910.

PROF. H. HERGESELL, of Strassburg, has been appointed to the direction of the Royal Prussian Aeronautical Observatory at Lindenberg, near Berlin, and desires that communications intended for him or the International Commission for Scientific Aeronautics, of which he is president, should be addressed to the

Königl. Preussisches Aeronautisches Observatorium Lindenberg (Kreis Beeskow).

DR. F. J. BECKE, professor of mineralogy in the Imperial and Royal University of Vienna (Austria); Dr. T. C. Chamberlin, professor of geology in the University of Chicago (Illinois), U.S.A.; Dr. F. J. Lœwinson-Lessing, professor of mineralogy and geology in the Polytechnic Institute of St. Petersburg (Russia); Dr. A. P. Pavlow, professor of geology and palæontology in the Imperial University of Moscow (Russia); and Dr. W. B. Scott, professor of geology in the Princeton University, Princeton (New Jersey), U.S.A., have been elected foreign members of the Geological Society of London. Dr. P. Choffat, Geological Survey of Portugal, Lisbon, and Dr. Charles R. Van Hise, president of the University of Wisconsin, Madison (Wisconsin), U.S.A., have been elected foreign correspondents of the society.

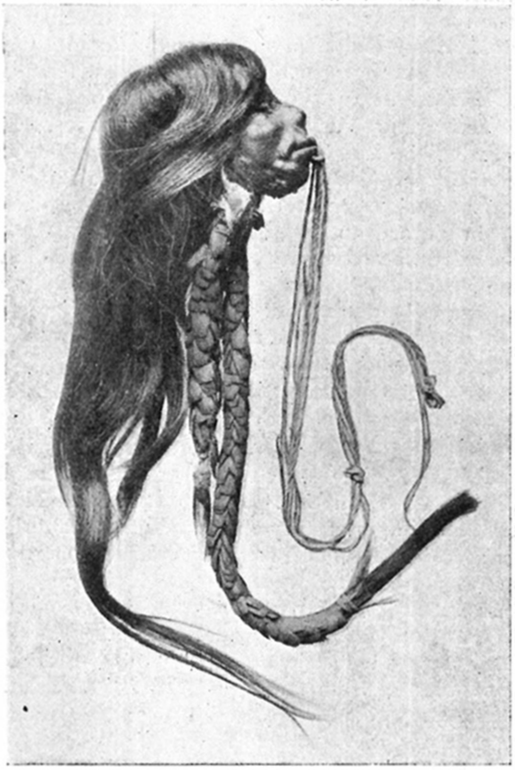
THE Elliott Cresson medals have been presented by the Franklin Institute, Philadelphia, this year as follows:—To Prof. Karl P. G. Linde, for his scientific investigations of the processes of refrigeration and the liquefaction of gases, and his inventions of machinery for applying these processes in the manufacture of ice and for the purposes of cold storage; to Dr. E. F. Smith, for his work in the field of electrochemistry, his contributions to the literature of chemical science, and his service in university education; to Prof. J. M. Eder, for his researches in photochemistry and his contributions to the literature of that science and of the graphic arts; to Mr. Orville Wright, for the work accomplished by him, at first together with his brother Wilbur and latterly alone, in establishing on a practical basis the science and art of aviation.

THE Dorset Field Club intends this month to reopen the Dewlish Trench, about which there has been much discussion. This trench is in chalk, and is filled with fine sand below, and above by loam with bones of *Elephas meridionalis*. An open gash in soft chalk is so exceptional as to lead the Rev. Osmond Fisher to suggest lately that this must be an artificial elephant-trap; other geologists take it to be natural, though formed in some way not clearly understood. Should it prove to be an elephant-trap, several interesting questions are raised. *Elephas meridionalis* is not definitely known as Pleistocene; it occurs in Pliocene or pre-Glacial strata, and seems to have disappeared from Britain at the incoming of the cold. The association of this elephant with man would be a new point, though some supposed "eoliths" have been picked up near the trench. The infilling of the trench is peculiar. The bones belong to several individuals, and if they were trapped it seems to have been for the meat alone, for the tusks remain. Below the elephant-layer is fine dust-like desert sand, with highly polished flints. The circular sent to us by the Earthworks Committee of the Dorset Field Club shows that the work will be properly done. Mr. Charles Prideaux will camp on the spot, which will be carefully enclosed. The trench will be opened from end to end, until the undisturbed chalk-bottom is reached. All fossils and flints will be carefully collected and examined. The Dorset Field Club proposes to visit the trench on June 30.

THE *Armauer Hansen*, of Bergen, a vessel of about fifty tons, but replete with all up-to-date apparatus for the investigation of the hydrography of the sea, started from Plymouth on June 2 on a two months' cruise in the Atlantic. The scientific work of the cruise will be conducted under the direction of Prof. Helland-Hansen, director of the Marine Biological Station at Bergen, and he will also have the advantage of the advice of Prof. Fridtjof Nansen, who, with his son, accompanies the party. The vessel, which is only some 25 yards in length, is worked partly by motor and in part by sail. It has been built to stand any weather, being constructed somewhat after the plan of the Norwegian lifeboats. From Plymouth the *Armauer Hansen* will proceed in a south-westerly direction across the Atlantic for approximately five hundred miles, and then return eastward to Lisbon, where the party expects to arrive in a fortnight. From Lisbon the vessel will proceed to the Azores, and thence return, according as time permits, either by way of the English Channel or along the west coast of Ireland and Scotland, and *viâ* the Faröes to Bergen. During the cruise a detailed survey will be made in regard to such hydrographical factors as temperatures, currents, circulation, salinities, dissolved gases, penetration of light, points which in due time will prove to be not only of theoretical but of practical importance. The boat is manned by a crew of six and the scientific staff consists of Messrs. Grein, Grondahl, Gaarder, and Birkeland. The expenses of the cruise have been partly defrayed by the Nansen Fund.

BY the death of the great French electrometallurgist, Paul Héroult, which took place at Antibes on May 9, at the early age of fifty-one, modern metallurgical industry loses a figure of outstanding importance. Héroult's fame chiefly rests on the invention of the process which bears his name for the manufacture of aluminium, an invention which had the effect of creating a new industrial metal, but his work in the field of the electrometallurgy of steel, though less widely known, is scarcely less important. Héroult's early interest in aluminium was concerned with aluminium-bronze, for which it was supposed there might be a ready market, and his first patent in this direction was taken out in 1886. It was in 1888 that he tackled the problem of making pure aluminium, in conjunction with Dr. Kiliani, and in that year were founded the first aluminium works at Neuhausen. Héroult's master-discovery was that of a suitable solvent for alumina, and this he found in fused cryolite, $3NaF.AlF_3$. The establishment of the works of la Société Electrométallurgique française at Froges (Isère), followed soon after that of the Swiss works, and since then the manufacture of aluminium by the Héroult process has become an established industry in most of the chief countries of Europe. Héroult commenced his work on the manufacture of steel in the electric furnace in 1899, and in the following year a small trial furnace of 3000 kg. capacity was working successfully at La Praz. The part Héroult has since played in the development of the electrometallurgy of steel may be conveyed most convincingly by merely stating that more Héroult furnaces are in use than are those of any other type; no fewer, indeed, than thirty-one, consuming some 19,000 kw., out of a total of 129 furnaces taking 50,000 kw., a capacity, moreover, which will be doubled in the near future, when the large 22–25-ton Héroult furnaces now in course of erection will be put into operation. If the foundations of the new method have now been firmly laid, to Héroult can justly be accorded the chief share of the credit.

In the February issue of the Proceedings of the Academy of Philadelphia for 1914 Mr. H. N. Wardle describes and figures two specimens of the diminutive mummified human heads prepared by the Jibaro (Jivaro) tribes dwelling in the eastern valleys of the Andes around the head-waters of the Amazon, by whom they are called *tsantsa*. Although such mummies have been known to science since the year 1862, when one was described by Dr. Moreno-Maiz, in the Bull. Soc. Anthrop., Paris (vol. iii., p. 185), they are still so rare that each merits a separate description. Of the two specimens described by Mr. Wardle, one (figure here reproduced) has been recently acquired by the Philadelphia Academy; it was formerly in the Museum Umlauf, Hamburg. The second is in the private collection of Mr. S. Castner, of Philadelphia, by whom it was purchased at a sale in 1903, and wrongly stated to have come from Oceania. Accounts vary as to the method by which these heads—of which two examples are shown in the Natural History Museum—were prepared.



A "Tsantsa," or diminutive mummified head of a Jibaro Indian. From Proc. Ac. Nat. Sci. Philadelphia.

To vol. xliii., part 4, of the Rec. Geol. Surv. India, Dr. G. E. Pilgrim contributes an article on the correlation of the Siwaliks with European mammaliferous horizons, in which it is concluded that while the topmost conglomerates of the former (with remains of camels and Indian buffaloes) represent the Upper Pliocene, the Bugti beds correspond to the Lower Burdigalian or Upper Aquitanian of Europe. Several forms, including two genera of machærodont tigers, and a genus of bear, are described as new.

Papers recently received on American faunas include one, by Mr. N. de Witt Betts, on the birds of Boulder County, Colorado (Univ. Colorado Studies, vol. x., no. 4); a second, by Mr. M. M. Ellis, on the fishes of Colorado (*ibid.*, vol. xi., no. 1); and a third, by Dr. P. S. Welsh, on the North American worms of the family Enchytræidæ (Bull. Illinois State Lab. Nat. Hist., vol. x., art. 3). The last-named group, which has hitherto received scant attention from naturalists, comprises sixteen genera and many species (inclusive of several described as new by Dr. Welsh), ranging over America and Europe, and reported to occur in Siberia, N. Africa, and New Zealand, but mainly restricted to cold areas, including even glaciers. Allied in many respects to ordinary earth-worms, in others the Enchytræidæ display affinities with the lower Oligochæta.

Mr. L. Walmsley has written a concise illustrated "Guide to the Geology of the Whitby District" (Horne and Son, Whitby, price 1*s*.), which should be useful to the hundreds of summer visitors who go forth with hammers in their hands. We hope that this edition will be appreciated, since we are promised in that case a subsequent one on a somewhat fuller scale. A reference to the colour-printed drift map of the Geological Survey, Sheets 35 and 44, would seem desirable. The variety of Ammonite types, St. Hilda's "headlesse snakes," is well brought out in the illustrations.

Dr. C. Diener's description of the "Triassic Faunæ of Kashmir" appears as one of the folio memoirs of the Geological Survey of India ("Palæontologia Indica," vol. v., Mem. 1, price 4*s*. 4*d*.). In dealing with the fine series of ammonites, the author abandons his genus Danubites in favour of Waagen's Xenodiscus, of which several species are described. A new genus, Kashmirites, is introduced, allied to Xenodiscus and Sibirites. The Ceratite group is well represented in the zones corresponding to the European Muschelkalk. Although a passage is proved from the Tethys (Mediterranean) marine region to that of the Himalayas, communication was evidently restricted throughout the whole Triassic period, so far as cephalopoda are concerned.

The connection between ice and fog is well known, and within little more than two years both have taken a disastrously heavy toll of life. Both conditions are necessarily frequently referred to in the monthly meteorological charts of the North Atlantic published by the United States, Germany, and this country. Among the chief causes of ocean fog formation (quoted in the American charts) may be mentioned the mixture of masses of moist air of different temperatures, and the direct cooling of moist air coming into contact with icebergs or cold northern waters. The Meteorological Office chart for June points out that near the Banks of Newfoundland the risk from fog is about eight times greater in midsummer than in midwinter; in May and June the fog zone stretches from Europe to America. The German chart for June states that up to May 19 numerous bergs and extensive icefields were met with to the east of the Newfoundland Banks between 47° and 50° W. longitude. In some cases bergs were sighted so far south as 42° N. latitude. The southerly advance of drift ice usually ceases about the middle of June, and by the middle of July the ice limit rapidly recedes.

A summary of the weather for the past spring as shown by the results for the thirteen weeks ended May 30 has been issued by the Meteorological Office. The mean temperature for the period is above the average in all districts of the United Kingdom, the excess being as much as 3° in the north-east of England, 2·5° in the east of England, and from 1°–2° in all other districts. The south-east and the east of England are the only districts where the absolute temperature rose to 80°. The rainfall is only 85 per cent. of the average in the north-east of England, and the only other districts with a deficiency of rain are the midland counties with 97 per cent. of the average, and the north-west of England with 99 per cent. of the average. The greatest excess of rain is 140 per cent. of the average in the south-east and south-west of England, and 131 per cent. in the Channel Islands. In the east of England the rainfall is 113 per cent. of the average, and in the north of Ireland 112 per cent. The absolutely largest rainfall is 10·82 in. in the north of Scotland, and 10·21 in. in the south-west of England, whilst the least is 4·26 in. in the north-east of England. The mean temperature at Greenwich for the spring months, March, April, and May is 49·7°, which is 1·7 in excess of the average; it is precisely the same as in the spring of last year, but 1·8° colder than in 1912.

No. 5 of vol. iii. of the Memoirs of the Department of Agriculture in India contains a study by Messrs. F. J. Warth and D. B. Darabzett, of the "Fractional Liquefaction of Rice Starch." It is shown that different specimens of rice show very different behaviour as regards the temperature at which liquefaction of their starch occurs. The method adopted consisted in estimating the percentage of starch liquefied at intervals of temperature of 5°. The results published in this paper show that the cooking quality of rice is distinctly correlated with its starch quality, and that there is also a certain parallelism between these features and the ease with which the different samples undergo disintegration by dilute alkalis. Some kinds of grain contain a variety of starch which is far more resistant than that of others.

The importance of the mineral elements in the nutrition of farm animals has recently begun to receive recognition, and Research Bulletin No. 30 of the Agricultural Experiment Station of the University of Wisconsin, by Messrs. E. B. Hart, H. Steenbock, and J. G. Fuller, deals with the relation of the supply of calcium and phosphorus in the ordinary farm feeds to the animals' requirements; from the data considered a number of interesting conclusions are drawn. Grains in particular are deficient in calcium but rich in phosphorus, and rations wholly made up of grains will supply to the growing animal an amount of calcium dangerously near the critical level of intake. The supply of calcium also becomes an essential factor when continuous and high milk production are aimed at, and the diet must be suitably adapted in order to achieve this result, if necessary by the artificial use of calcium carbonate and phosphate.

Prof. Ignazio Galli has published in the memoirs of the Pontifical Academy of the *Nuovi Lincei*, of Rome, a fourth memoir on globular lightning, and on its effects on trees and on grass. The memoir quotes in an uncritical manner an enormous number of reputed instances of lightning of globular form, most of which were recorded by wholly untrained observers, and extend over several centuries. Prof. Galli adds little to the facts collected by Flammarion and other writers. He directs attention to observations which seem to show that the lightning stroke following a spiral path is usually *dextrorsum* in horse-chestnuts, cherry-trees, apple-trees, and willows, but *sinistrorsum* in plum-trees, whitethorns, oaks, and sycamores; in beech-trees sometimes one way, sometimes the other. He discusses whether this is due to inherent spiral structure of the fibre of the wood or to some special gyratory property of the discharge. Most of the observations are of such ancient date that critical discussion of them is out of the question.

An article in the Paris *Matin* was referred to by the Paris correspondents of several London daily papers last Saturday. It relates to some interesting experiments in wireless telephony carried out by Captain Colin, of the French Navy, who has been at work on the subject for some years in collaboration with Lieutenant Jeance. The details of the apparatus are not given, but it would appear that some improvement has been made in the direction of maintaining steady and continuous oscillations at the transmitting end. Speech, it is stated, has been transmitted from Paris to Finisterre, a distance of 300 miles, and a type of field apparatus with a mast about 90 ft. high has, it is said, been developed, which can be unloaded from a motor-car and set to work by a crew of six men in twenty-one minutes, and will transmit without difficulty over a distance of from 60 to 120 miles.

The most interesting communication brought before the meeting of the Bunsen Gesellschaft für angewandte physikalische Chemie at Leipzig on May 21–24 was a paper by K. Fajans on the different atomic weights of lead. According to a line of reasoning simultaneously developed by Fajans and by Soddy during the last few years, lead derived from radium and lead derived from thorium by the loss of five and six atoms of helium respectively should be identical except in atomic weight. Throughout the past year Dr. Fajan's assistant, Dr. Lembert, has been working in Richard's laboratory at Harvard in order to obtain atomic weights of as high a degree of trustworthiness as possible. The differences established by the series of determinations announced at the meeting by Fajans amount to about 0·3 per cent. (Soddy and Hymans read a paper before the London Chemical Society on May 7, in which they likewise described experiments which showed a difference between thorite lead and ordinary lead of 0·5 per cent.) The keen discussions which followed the various papers showed quite clearly that the chief subjects at present of general interest to physical chemists in Germany are: (1) applications of the theory of quanta; (2) the nature of sorption; (3) the photochemistry of gases; and (4) the generalisation made by Bredig and Snethlage, in extension of the work of numerous other investigators, as to the parallelism between the catalytic activity of undissociated acids and their strength. A striking illustration of the wide bearing of some of the (at first sight) apparently uninteresting special investigations were afforded by E. Cohen's paper on unstable modifications of pure metals. His results demonstrate that most measurements hitherto made of physical constants of metals, such as density and Hall effect, have not been carried out on chemical individuals, but on unknown mixtures of these unsuspected metastable forms, so that they require to be revised.

We have received the catalogue of microscopes, etc., made by C. Reichert, of Vienna, for which Messrs. Angus and Co., of Wigmore Street, are the British agents. Since the foundation of the firm in 1876, 55,000 microscopes have been produced. The catalogue comprises microscope stands of varying complexity, achromatic and apochromatic objectives, comparison eye-pieces and other accessories, polarimeters, and microtomes. Both workmanship and prices compare favourably with those of other well-known makers.

We have seen the March issue of *Gendai no Kagaku* (*Scientific Gazette*)—a new Japanese journal similar to Nature, printed in Japanese characters. It has been designed to meet an increasingly felt need for a serious and authoritative general organ for the growing body of men of science and students of research in Japan. The journal is well printed, and its contents are written and edited by professors of the Tokyo and Kyoto Imperial Universities. The issue before us contains special articles on insects and their pupæ, the relation between zoology and medicine, great men of science, and inertia and relativity; reviews of books; notes and abstracts classified under the various sections of astronomy, physical geography, biology, chemistry, and applied sciences; meteorological reports and ephemerides of celestial phenomena, and proceedings of societies. In the last-named section no fewer than eight learned societies of Tokyo are represented. The illustrations include a collotype portrait of Prof. Simon Newcomb, and a star chart, to be continued serially. The publication is to be welcomed as a sign of the increase of interest in scientific subjects in Japan.

Prof. W. Bateson's work on "Mendel's Principles of Heredity" has been translated into German by Alma Winckler, and published with an introduction by Prof. R. von Wettstein, under the title, "Mendel's Vererbungstheorien," by Mr. B. G. Teubner, Leipzig and Berlin, at the price of 12 marks. Another translation just received from the same publisher is "Pflanzenanatomie," translated by Dr. S. Tschulok from the fifth Russian edition of Prof. V. I. Palladin's work. We have also received a volume entitled "Theory of the Atom," by Prof. T. Mizuno, of Kyoto Imperial University, Japan, published by the Maruzen Co., Ltd., Tokyo, but as it is in Japanese characters it is intelligible only to a few European men of science, and no useful purpose would be served by reviewing it in these columns.

OUR ASTRONOMICAL COLUMN.

Astronomical Occurrences for June:—

June 11. 9h. 0m. Jupiter stationary.
„ 15h. 33m. Uranus in conjunction with the Moon (Uranus 1° 48′ N.).
12. 12h. 32m. Jupiter in conjunction with the Moon (Jupiter 0° 44′ N.).
18. 20h. 0m. Mercury at greatest elongation (24° 55′ E.).
21. 18h. 55m. Sun enters Sign of Cancer. Summer commences.
22. 12h. 24m. Saturn in conjunction with the Moon (Saturn 6° 1′ S.).
25. 21h. 9m. Venus in conjunction with the Moon (Venus 0° 46′ S.).
27. 15h. 58m. Mars in conjunction with the Moon (Mars 0° 36′ N.).

Comet 1914*b* (Zlatinsky).—*Astronomische Nachrichten*, No. 4737, publishes the elements and ephemeris of the comet discovered by Zlatinsky (1914*b*) calculated by Mr. Crawford and Miss Levy. These agree very closely with those computed by Prof. H. Kobold, and published in this column on May 28 (p. 330). A further communication to this number by Prof. E. C. Pickering states that Dr. Perrine cables the similarity of Zlatinsky's comet with comet 1790 III., Caroline Herschel. The following ephemeris has been calculated by Dr. Ebert, and appears in *Das Weltall* for May:—

	R.A. h. m. s.	Dec. ° ′
June 11	8 55 57	+1 17·9
13	9 1 52	−0 50·3
15	9 7 1	2 45·3
17	9 11 37	4 26·1
19	9 15 44	−5 56·2

Fireballs.—Mr. W. F. Denning writes that on June 3 at about 10.30 p.m., and June 4 at 11.7 p.m., brilliant meteors were observed by Mrs. Fiammetta Wilson, of Bexley Heath. The former had a path from 80°+46° to 33°+59°, which it traversed in $6\frac{2}{5}$ seconds, carefully timed by stop-watch. The latter was placed near the N.W. horizon, close to the stars Castor and Pollux, and seemed to explode with a flash brighter than Venus.

The fireball of June 3 was seen at Bristol, and a comparison of the pair of observations shows its height to have been about fifty-one to forty-eight miles. It flight was almost horizontal from a radiant near the S.E. horizon in 281°−25°. Path about 160 miles long, velocity twenty-five miles per second. It began over The Wash and ended over the county of Durham.